

Claims:

1. A hot embossing method, which can quick heat and cool, and apply uniform pressure onto an object being closely placed against a mold in a sealed chamber, the method being characterized in that the sealed chamber is separated into a first space and a second space by the object in such a manner that the object and the mold are inside the second space, and a high pressure fluid is introduced into the first space when the object is heated to be thermoplastic, thereby to replicate a microstructure formed on the mold onto the object by means of the pressure of the high pressure fluid without using a pressing mechanism.
2. A method as claimed in claim 1, further comprising a step for cooling the object and the mold by flowing a coolant into a conduit provided in the sealed chamber after the high pressure fluid directly presses the object against the mold.
3. A method as claimed in claim 1, wherein the high pressure fluid is heated to a temperature sufficient to make the object thermoplastic.
4. A method as claimed in claim 1, wherein the high pressure fluid is heated to a temperature before being introduced into the sealed chamber, and after being introduced into the chamber, the high pressure fluid is reheated to a second temperature by a high temperature fluid flowing through a conduit provided in the chamber so as to heat the object to be thermoplastic.
5. A method as claimed in claim 1, wherein the object is heated to be

thermoplastic by a radiation heater provided inside the chamber.

6. A method as claimed in claim 1, wherein the radiation heater is selected from a group consisting of a far infrared heater, a high frequency heater, a UV heater, and a halogen light.

7. A method as claimed in claim 1, wherein the high pressure fluid has a pressure in a range between  $0.5 \text{ kgf/cm}^2$  and  $350 \text{ kgf/cm}^2$ , and the object is embossed for a time period from 10 seconds to 30 minutes.

8. A method as claimed in claim 1, wherein the object is one of a plastic film and a metal foil.

9. A method as claimed in claim 1, wherein the high pressure fluid is selected from a group consisting of steam, oil, air, water, inert gas, nitrogen, and combinations thereof.

10. A hot embossing method for forming microstructures onto both surfaces of an object, which can quick heat and cool, and apply uniform pressure onto an object, the method being characterized in that the object is sandwiched by two separate molds to form an assembly to be embossed, a sealing film covers the assembly, a chamber presses against the edge parts of the sealing film to enclose the sealing film and the assembly therein in such a manner that a space inside the chamber is separated into a first space and a second space by the sealing film and the assembly is located inside the second space, and a high pressure fluid is introduced into the first space when the object is heated to be thermoplastic, thereby to simultaneously replicate the microstructures of the two molds onto both surfaces of the object by

means of the pressure of the high pressure fluid without using a pressing mechanism.

11. A method as claimed in claim 10, further comprising a step for cooling the object and the mold by flowing a coolant into a conduit provided in the sealed chamber after the high pressure fluid directly presses the object against the mold.

12. A method as claimed in claim 10, wherein the high pressure fluid is heated to a temperature sufficient to make the object thermoplastic.

13. A method as claimed in claim 10, wherein the high pressure fluid is heated to a temperature before being introduced into the sealed chamber, and after being introduced into the chamber, the high pressure fluid is reheated to a second temperature by a high temperature fluid flowing through a conduit provided in the chamber so as to heat the object to be thermoplastic.

14. A method as claimed in claim 10, wherein the object is heated to be thermoplastic by a radiation heater provided inside the chamber.

15. A method as claimed in claim 14, wherein the radiation heater is selected from a group consisting of a far infrared heater, a high frequency heater, a UV heater, and a halogen light.

16. A method as claimed in claim 10, wherein the high pressure fluid has a pressure in a range between  $0.5 \text{ kgf/cm}^2$  and  $350 \text{ kgf/cm}^2$ , and the object is embossed for a time period from 10 seconds to 30 minutes.

17. A method as claimed in claim 10, wherein the object is selected

from a group consisting of a plastic sheet, a metal foil, a ceramic sheet and a polymer coated on a substrate.

18. A method as claimed in claim 17, wherein the substrate is selected from a group consisting of a silicon wafer, a plastic plate, a glass plate.

19. A method as claimed in claim 10, wherein the sealing film is one of a plastic film or a metal foil.

20. A method as claimed in claim 10, wherein the high pressure fluid is selected from a group consisting of steam, oil, air, water, inert gas, nitrogen, and combinations thereof.